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**AGRICULTURAL
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FOR AFRICA**



FOOD AND
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ORGANIZATION
OF THE
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To the Reader:

The *Agricultural Economics Bulletin* is published twice yearly. Articles are invited from professionals working in universities, governments' ministries and departments and other organizations, all over the world, who are interested in the economic problems and development of agriculture with particular relevance to African conditions. No fees are payable but authors will receive a minimum of 20 copies in English and/or French of *published articles*. Guidelines for submitting articles appear on the last page.

The Editor would be glad to receive copies of all official documents, reports, statistical data, etc., dealing with agriculture and agricultural development in Africa.

The Editor

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ARTICLE I

A MONETARY STRATEGY FOR UNDERDEVELOPED RURAL AREAS^{1/}

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INTRODUCTION

Most developing countries have little else besides land and labour at their disposal. Industrial development is unlikely to get underway until purchasing power has been built up among rural workers. This means that the key to economic growth will often lie in initial increases in agricultural productivity. But if we are to identify a catalyst for a more productive combination of what is often an abundant supply of "under-utilized" land and labour, that catalyst would probably be cash. Credit - its volume and its price - will play an important part in any plans for rural advancement.

Even the most labour-intensive techniques for cultivation will require some capital, often relatively small amounts to be sure, but nevertheless it must be provided if improvements are to be undertaken. An access road into hitherto uncultivated lands can be built by a government. Land-hungry peasants will, no doubt, somehow find the food and seed reserves to move, to clear, and to cultivate the empty areas which the road opens up. But they will probably lapse into subsistence production unless they are encouraged to borrow to buy other seed for quality, marketable crops, or to finance the period of waiting which so much exportable tree production requires. If they can get money at all for these purposes, it is likely to be at such a compound rate that the incentive to carry through cash crop production may be much reduced. The same may well be true of techniques for more intensive cultivation; of borrowing for irrigation pumps, for fertilizer, and all the other instruments of encouraging two ears of corn where one alone once grew.

But all this is generally conceded. These are the platitudes of those economists who concern themselves with such matters. Thinkers in the field generally conclude that the answer is to replace the village usurer by a system of low-cost government credit. Yet attempts to do this often meet with failure. The costs of lending to insolvent farmers are customarily high. The village moneylender may not be quite the usurer he seems. But, if this is true, the question still remains - what can a government do to lower rural interest rates and stimulate investment?

^{1/} This is a monograph by Professor Bottomley in 8 Chapters, the first two of which are reproduced here, and will be continued in subsequent issues. Further articles will deal with the cost of administering private loans in rural areas, the premium for risk and monopoly profit as determinants of interest rates, and a model of the rural loanable funds market, with an application of a comprehensive model.

Our purpose, then, is to start economists thinking about this problem along rather different lines to those envisaged up to now. In particular we will try to show that governmental credit policy must concentrate on increasing the demand for loanable funds in certain prescribed ways. It is the enumeration and description of these ways which forms the key to our thesis.

We will see that there are good reasons for supposing that demand for rural credit creates its own supply, and that at lower interest rates. In the right circumstances, the supply of finance capital to farmers in poor countries can issue from a widow's cruse. As the chain of events which we will describe unfolds, dollars, pesos or rupees for fertilizer purchase, land settlement or other capital-using innovations issue forth in growing abundance and at a lower cost. Yet fanciful as this may seem, it is no more than a description of what has, in fact, happened as agricultural productivity has grown throughout the western world. But a repetition of all the stages in that growth will not be necessary, at least where rural credit is concerned. It is, then, our intention to develop a model which sets out to describe the shortest route from miserly capital supply at extremely high rates of interest to plentiful credit at relatively low cost.

But all this may imply that a solution to the credit problem which has taxed so many governments throughout the Third World is a simple one. It manifestly is not, or the problem would have been solved long ago. The difficulties of getting low-cost credit to the farmer are enormous, an analysis of these difficulties complex, and our model of a solution elaborate. Nevertheless, our analysis is largely based on empiric evidence from all over the world, albeit patchy. It seems plausible to the writer and may appear so to the reader. If, therefore, the evidence is correctly adduced, and the model which arises from it logically consistent, then the solutions which it suggests are worthy of consideration everywhere. Economists must first question that the essence of credit markets in underdeveloped rural areas has been roughly described. They must seek out inconsistencies in the model which embodies this essence. If they are satisfied on both these counts, they must look for errors in emphasis. If they see none, they are duty-bound to support the argument with whatever influence they may command. However, it is extremely unlikely that this monograph will pass all three of these tests with many of its serious readers. Economists often disagree.

The object of this paper is principally to set a discussion going on rural credit in poor countries which is informed by a theoretical framework. This framework is the first to be specifically designed for the subject.

THE DETERMINATION OF PURE RATES OF INTEREST IN UNDERDEVELOPED RURAL AREAS

The determination of interest rates in rural areas throughout the underdeveloped world is best explained in micro-economic terms. The typical village moneylender will either be an outright monopolist, or he will be an imperfect competitor.^{1/} The market for loans will centre around the village itself. The farmer will normally only borrow from the one or more moneylenders that the village can support. He will not often have access to a bank or other lending institution. In these circumstances, the moneylender will face a demand curve for his loans which will slope downwards from left to right. The rate of interest will be on the vertical axis and the volume of loans on the horizontal axis.^{2/} He will also have a schedule of costs of lending. This will be compounded of the administration and risk charges on each unit which he lends, together with the opportunity cost of his raw material - money. It is this last component which corresponds to the pure rate of interest of existing theory.

The average cost-of-lending curve will describe the arc familiar to the student of the principles of economics. There will be a certain volume of loans which will maximize the moneylender's net returns. This volume will be at his equilibrium level of lending, and it will determine his most profitable interest charge. It is the opportunity cost of each dollar or peso which he advances at this equilibrium point which we will analyse here. Of course, the typical village moneylender will not think things out in exactly these terms. Rather may he move towards such a personal equilibrium by the exercise of a certain shrewdness which tells him where his interests really lie. Moreover, the simple analytical framework is not the one which we will ultimately use. It suffices, however, to introduce the reader to the argument within a familiar framework of reference. But the subject ultimately becomes too complex for standard factor-pricing analysis to bear the burden of devising a solution. Nevertheless, questions of average administration and risk charges, as well as monopoly profit can be dealt with in the foregoing accepted way, and are so treated later. The uncomplicated theory which the sections on credit supply contain is then incorporated in the more comprehensive model described later.

1/ See, for example, Report of the Committee of Direction - All India Rural Credit Survey (Bombay: Reserve Bank of India, 1954), p.102; G.M. Meier and R.E. Baldwin, Economic Development (New York: John Wiley and Sons, Inc., 1957) p.392; U.A. Aziz, Tenth International Conference of Agricultural Economists at Mysore, 1958 (London: Oxford University Press, 1960) p.399; S.G. Panandikar, Banking in India (Madras: Orient Longmans Ltd., 1956) p.57; and Charles Gamba, "Poverty and some Socio-Economic Aspects of Hoarding, Saving and Borrowing in Malaya", Malayan Economic Review, Vol.III, No.2, (October 1958), passim.

2/ For a discussion along these lines so far as the imperfect markets for rural credit in the United States is concerned, see, Reynold P. Dahl, "Some Price Discrimination Aspects in Bank Farm Loan Interests Rates", Journal of Farm Economics, Vol.XLIV, No.1 (Feb. 1952) pp.126-140, and David A. Alhadeff, Monopoly and Competition in Banking (Berkeley and Los Angeles: University of California Press, 1954) p.121.

For the time being then, if we view the opportunity cost of the lender's money as one of the determinants of his costs, we could draw a curve representing these charges. It would probably run parallel to the volume of lending axis to begin with and then rise quite sharply as the moneylender adds to his loans. The unit opportunity cost is thus registered on the vertical axis, and it forms one of the components of the interest rate which the farmer must ultimately pay.

The reasons why the opportunity cost of the money used in a lender's loans will determine the shape of such a curve, can best be explained under two separate headings. They are:

- (1) The returns on alternative investments; and
- (2) Liquidity preference.

(1) Returns on alternative investment

Let us suppose that a particular village moneylender has more cash than he needs. What can he do with this excess? He can invest it in real estate, fixed interest securities, and so forth. If generally competitive conditions obtain, apart from village money lending itself, then the net returns on these alternative investments, should be forced down to equality with the rate of return on investments without either risk or administration costs, such as government bonds.^{1/} The opportunity cost of the moneylender's cash would therefore equal the rate of return on such securities, and it is probably appropriate for us to consider it as such. The interest which the moneylender charges the farmer will, then, have to cover this opportunity cost, plus a premium for administration and risk on each unit loaned. Any interest rate which is in excess of these unit charges will contain an element of monopoly profit.

In these circumstances, the pure rate of interest (opportunity cost of the money loaned) really reflects the operation of forces which are very largely outside the rural economy itself. Keynes would have said that it would depend on the supply of and demand for money to hold in the organized money market. In an underdeveloped country this market reposes largely in the towns.^{2/} One would therefore think that it would be subject to the influence of monetary policy. If prices remain stable in the face of increasing supplies

^{1/} At least this appears to have happened in India (see, Rajindar Singh Johar, "Cost of Capital Issues in India", Indian Journal of Economics, Vol. XLI, No.162 /January 1961/, pp. 241-248).

^{2/} See, for example, S.N. Sen, Central Banking in Undeveloped Money Markets (Calcutta: Bookland Private Ltd., 1952) passim.

of money, then interest rates might be expected to fall in the towns and so reduce the opportunity cost of the moneylender's cash. But unfortunately the price of the main consumer item - food - will normally rise quite sharply in an underdeveloped country if the money supply is increased, due to inelasticity of supply. At least this is likely to be true in the short-run. Therefore, increases in the money supply will often cause interest rates to rise as lenders demand compensation for the expected decline in the purchasing power of money up to the time of repayment.^{1/} Quantitative changes in the money supply, therefore, cannot be relied upon to reduce the pure cost of lending to the farmer or anyone else. Conditions are different to those obtaining in a developed country, where industry, which may be operating below capacity, is likely to be the principal supplier of consumer goods,^{2/} although it has to be admitted that the relatively small manufacturing sector in poor countries does, in fact, habitually operate at well below full capacity.^{3/} But this is probably due to imperfectly competitive markets which allow a proliferation of factories in the face of a modest demand for the finished product. Increases in the money supply may not be expected to bring these factories closer to capacity production. Rather might it encourage a further unwarranted increase in the number of factories in the field.

But be that as it may, as has been pointed out, increased monetary demand is likely to be channelled to a considerable extent into further demand for food. The cost of living index will then go up and moneylenders will incorporate an inflationary premium in their pure interest rates, although in some countries these inflationary premia have not been nearly sufficient

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- ^{1/} See, for example, Colin D. Campbell and Chang Shick Ahn, "Kyes and Mujins - Financial Intermediaries in South Korea", Economic Development and Cultural Change, Vol. XI, No.1 (Oct. 1962) and Domestic Financing of Economic Development (New York: United Nations, 1950) pp.81 and 82 (cited by U Tun Wai, "Interest Rates Outside the Organized Money Markets of Underdeveloped Countries", Staff Papers of the International Monetary Fund, Vol. VI (1957-58), p.119.
- ^{2/} See V.K.R.V. Rao, "Investment Income and the Multiplier in an Underdeveloped Economy", Indian Economic Review, Vol.I, No.1 (Feb. 1952), pp. 59-61, and Man Mohan Singh, "Monetary Policy and Economic Expansion", Indian Economic Review, Vol.IV, No.3 (Feb. 1959), p.47.
- ^{3/} See, for example, Government of Ecuador, Junta Nacional de Planificación y Coordinación Económica, Plan General de Desarrollo Económico y Social, La Industria Fabril (Quito, 1963), p.36; Gerald M. Meier, "Export Stimulation, Import Substitution and Latin American Development", Social and Economic Studies, Vol.10, No.1 (March 1961), p.62; and E.L. Wheelwright, "Reflections on Some Problems of Industrial Development in Malaya", The Malayan Economic Review, Vol. VIII, No.1, April 1963, p.74.

to compensate the lender for losses in the purchasing power of his principal. This has certainly been true in Chile where negative real interest rates are reported for recent years, and it has also been the case in some sectors of the Colombian 1/ and Brazilian 2/ money markets. But we shall return to this point later.

Moreover, expansions in the money supply need not necessarily be met by rising food prices if the newly created credit goes directly into highly productive agricultural innovations. Indeed, there may even be instances in which the rural monetary authorities might encourage an expansion in the supply of money along with increases in the velocity of its circulation, but this is not the same thing as the unselective monetary expansion discussed above. Loans for the purchase of fertilizer or for otherwise unsupported land settlement, for example, might quickly result in increases in the supply of goods worth several times the value of the credit which brought them into being. In the United States it has been calculated that at least one-third of the value of agricultural production can be attributed to the use of commercial fertilizers, while their cost totals only six per cent of the nation's farm outlays.3/ In parts of Africa, fertilizers appear to yield four or five times their cost in added production.4/ In Ecuador, it has been estimated that the Government need invest only some US\$10 per family in order to get spontaneous colonization schemes going, although eventual credit requirements for market production may be up to an additional US\$15 per hectare.5/ But experience shows that each one of these hectares is capable of annual yields valued at between US\$85 and US\$145.6/ In these

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- 1/ Charles T. Nisbet "Interest Rates and Imperfect Competition in the Informal Credit Market of Rural Chile" (Madison Wise: University of Wisconsin, Land Tenure Centre, August 1966), Table II, p.7 (Mimeographed), and D.W. Adams, A. Giles and R. Pena, Supervised Credit in Columbias Agrarian Reform (Madison: University of Wisconsin - Land Tenure Center, January 1966), p.141.
- 2/ FAO, New Approach to Agricultural Credit (Rome 1964), pp. 16-42.
- 3/ Edward F. Renshaw, "Distributed Lags, Technological Change, and the Demand for Fertilizer", Journal of Farm Economics, Vol. XLIII, Part 1 (Nov. 1969), pp. 959-960.
- 4/ Montague Yudelman, Africans on the Land (Cambridge, Mass: Harvard University Press, 1964), p.157.
- 5/ Government of Ecuador, Junta Nacional de Planificación y Coordinación Económica, Plan General de Desarrollo - Colonización, (Quito, 1963), pp. 181-347.
- 6/ Economic Commission for Latin America, "Productividad de la Agricultura Ecuatoriana", Boletín Económico de América Latina, Vol. VI, (October 1961).

circumstances, Keynesian-type increases in the total supply of money will be met by a fairly rapid increase in the supply of goods to match any multiplied monetary demand. Prices need not rise and they may even fall. There need be no inflationary premium in the interest rate and pure rates could even decline with increases in the money supply. Yet governments must exercise extreme caution in putting such a line of argument to the test. Discovering where the necessary preconditions exist is part of any monetary strategy.

But, even where monetary expansion does lead to increases in the price of food, this may result in lower rural interest rates through the effect upon village moneylender's monopoly profits as well as this premium for risk. Increased cash earnings may not be matched by higher farm expenditures. They may thus reduce the peasant's demand for loans and so help to eliminate whatever monopoly profits a moneylender has. Higher prices can also increase the cultivator's returnable income as well as the value of any collateral in land and crops. All this will reduce the moneylender's premium for risk on whatever he may loan. But higher food prices in the town may not always be passed on to the farmer if the intermediate buyer of his produce, who may also be the moneylender, is able to avoid paying more for a crop. At all events, given such imperfections in the market for produce and in the dispensation of rural credit, it is unlikely that monetary expansion in the organized money market can be used to force down interest rates in rural areas by any significant amount.

Moreover, monetary policy is not the only route to a reduction in the opportunity cost of the lender's reserves. There is also the possibility of a fiscal approach. The moneylender will normally make his advances from sowing to harvest, or for some period in between the two.^{1/} This means that if the rate of return on fixed interest securities is 6 per cent annually,

^{1/} A rural credit survey in Chile revealed that, "the most typical term was until harvest (from six to nine months) with 40 per cent of loans carrying this term" (Charles Nisbet, "Interest Rates and Imperfect Competition", University of Wisconsin, Land Tenure Centre, paper No.23, August 1966, p.13). In Ecuador it was 10.2 months mean (The Agricultural Finance Centre of the Ohio State University, "Agricultural Credit Research in Ecuador, No.10" Columbus, 1966, p.3). See also, Consortium for the Study of Nigerian Rural Development, A Situation Report of Agricultural Credit in Nigeria (East Lansing: Michigan State University - 204 Agricultural Hall, June 1966), pp. 7 - 108, and Jose P. Gapud, "Financing Lowland Rice Farming in Selected Barrios of Munoz, Neuva Ecija", Economic Research Journal, Vol. VI, No.2 (Sept. 1959), p.80. In Mauritius "one shopkeeper estimated he was owed Rs.500-600 per month during the inter-crop period, but only Rs.100-200 during the crop season (Burton Benedict "Capital, Saving and Credit among Mauritian Indians" in R. Firth and B.S. Yamey, Capital Saving and Credit in Peasant Societies /London: George Allen and Unwin 1964/).

and if he loans to farmers for only six months in each year, the opportunity cost to the lender of money which would lie idle for the remaining six months is 12 per cent for the duration of the loan. In these circumstances, governmental attempts to sell short-term treasury bills of the required value and duration to moneylenders could effectively cut the opportunity cost of the cash which he loans by anything up to half. However, unless the government kept this money dead (i.e., sold the treasury bills solely in order to help the moneylender) the velocity of its circulation would increase, and some inflation might result. Consequent reduction in the pure rate might therefore be ameliorated to some extent by the appearance of an inflationary premium as lenders demanded compensation for expected falls in the purchasing power of the means of repayment. Further, there seems to be no definite evidence that moneylenders are unable to find alternative uses for their cash in off-seasons of the year. Indeed, in Haiti for example, it seems that reserves are transferred into and out of agriculture according to need through the medium of marketwomen.^{1/} Nevertheless it seems likely that there will be some under-utilization of village moneylender funds in the off-seasons of the year.

(2) Liquidity preference

The picture is somewhat different when we come to a situation in which the moneylender's overall marginal cost and revenue conditions make it expedient for him to lend up to a point where his desire to keep cash on hand can no longer be met by the return on outside investments. In this event he may feel that it is in his interests to lend out cash for which he has a liquidity preference in excess of the going rate of return on, say, government bonds. The more he lends to the farmer, the greater will be the pain of parting with liquidity and the higher will be the real costs on each dollar or peso which he advances. Such a situation is likely to arise in one of two sets of circumstances. They are: (1) when a moneylender operates on slender reserves and has no outside investments, and (2) when his reserves are normally adequate, and where his liquidity preference is equal to, or below the rate of return on outside investments, but where they are nevertheless insufficient to meet sudden increases in the demand for his support. The second situation might arise in times of harvest failure.

In both instances the moneylender will be in need of outside sources of funds. In case (1) it would be better if he were able to obtain loans from a wholesaler, from a larger moneylender in a town, or from a bank. It would also be useful if the farmers themselves were to deposit their earnings with moneylenders and thus turn them into banks.

^{1/} Sidney W. Mintz. "The Employment of Capital by Marketwomen in Haiti", in Firth and Yamey, op.cit., pp.272-274.

In case (2) the situation is a little different. Here it is a sudden increase in funds which is required in order to meet an emergency such as might arise when a crop fails. The real need is for a greater elasticity in the supply of the moneylender's reserves. But both cases raise the question of the lack of contact between the organized (urban) and the unorganized (rural) money market. This difficulty has been a major preoccupation of those who have been concerned with the problem of getting credit to the farmer in poor countries. The crux of the matter is that the larger institutional lenders face a number of obstacles when it comes to providing credit in the rural market.^{1/} Various strictures raise their risks as well as their administration costs on loans to small farmers. Chief among these is the absence of satisfactory collateral against which they could foreclose in the event of default. Some of these strictures may also apply to institutional advances through the intermediary of the moneylender who normally has methods of enforcing repayment which a bank could never use.^{2/} A bank may not repose much more trust in a moneylender's willingness and ability to repay than it does in that of the farmer with whom he customarily deals. As far as the village moneylender's charges are concerned, the problem narrows down to one of having rural borrowers provide them with security which they can discount with a credit institution or larger moneylender in a town. Given properly graded and warehoused crops against which certificates can be issued, the village moneylender would be able to accept those documents as collateral and discount them with a larger lender should the need arise.^{3/}

As it stands at the moment, however, security of this kind is most often not available, and such elasticity of credit supply as exists will have to come from wholesalers who either buy the farmer's crop which the moneylender may collect, or who provide trading goods which the village moneylender may also sell. In other words, only the trader-cum-moneylender is likely to have even this source of outside funds and even he may not.

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- ^{1/} See, All India Rural Credit Survey, p.190; U Tun Wai, op.cit., pp. 95-129; Sen, op.cit., pp. 38 et seq., U Tun Wai, Burma's Currency and Credit (Bombay: Orient Longmans Ltd., 1953), pp. 64-65; Siew Nim Chee, "Central Banking in Malaya", included in Central Banking in South-East Asia (Gethyn Davies, Ed.) (Hong Kong: University Press, 1960), p.125; and Panandikar, op.cit., pp. 50-58.
 - ^{2/} C.R. Wharton, "Marketing, Merchandising and Moneylender: A Note on Middleman Monopsony in Malaya", Malayan Economic Review, Vol. VII, No.2 (Oct. 1962) pp. 34-35, and All India Rural Credit Survey, pp. 171-172, 245-279, and 483.
 - ^{3/} See, for example, Ralph von Gersdorff, "Agricultural Credit Problems in Brazil", Indian Journal of Economics, Vol. XLI, No. 161 (Oct. 1960), p. 164, and All India Rural Credit Survey, pp. 190-196 and 482-484.

Sudden increases in the demand for loans will often meet a near-to-perfect inelastic supply of reserves. In these circumstances the moneylender may part with liquidity until the sacrifice of so doing reaches "exorbitant" proportions, and the unit cost of lending rises sharply.1/

CONCLUSIONS

Any answer to the question of how to lower the opportunity cost of the units of currency which village moneylender loans, narrows down to considerations covering the rate of return on outside investment, and/or the lender's preference for cash. Little can be done to reduce these opportunity costs apart from selective monetary expansion, the provision of short-term securities to village moneylenders, and/or the creation of conditions in which he can discount whatever loans he makes.

1/ In fact, however, situations of this kind may not predominate. The All India Rural Credit Survey (p. 178), for instance, reported that only 28 per cent of the moneylenders interviewed expressed the need to try and obtain funds in addition to their own reserves.

ARTICLE II A REVIEW OF FARM MANAGEMENT RESEARCH IN EAST AFRICA

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INTRODUCTION

This article attempts to give a background description of the farm management investigations which have been undertaken in East Africa. It focusses on the methodologies employed, and the outstanding problems in this area, rather than the application of the information gathered. There is no attempt to be fully comprehensive, and individual surveys and research projects are used primarily to illustrate the main characteristics of the category of investigation into which they have been placed. Three main types of farm management investigation have been recognized:

- (i) Those primarily concerned with a description of the agricultural economy, but which may involve descriptions of individual holdings - i.e., those employing ex-post analytical techniques;
- (ii) Those concentrating on gathering data for use in forward planning - i.e., those employing ex-ante analytical techniques; and
- (iii) The final category, which contains single enterprise studies, and those studies concerned mainly with work measurement.

It is realized that the above framework excludes many other surveys and investigations which impinge on the realm of farm management. These have been omitted mainly because they are predominantly consumers and collators of information, rather than generating their own data from primary sources. Among the types of investigation in this category, are surveys and descriptions of general agricultural systems, commodity studies, institutional surveys, project investigations, national agricultural sector surveys, and commissions. Other work such as sociological studies and surveys of different aspects of agricultural extension services, does generate primary data, but has been excluded, mainly because it lies outside the field of farm management proper, although having close affinities with the discipline.

Within each main type of investigation there are contrasts in the details of the methodology employed. To illustrate these differences, it is helpful to distinguish the various stages of any study of this nature. The initial data collecting stage involves choice of sampling technique and collection procedures, and optimum methods are indicated by an array of interacting factors. East African experience affords interesting comparisons in this problem area, one in which many questions are still

outstanding. The next stage, that of data processing, has seen some recent advances, but in general, the resources used in summarizing and preparing data for analysis, have not been employed very efficiently. Many types of analysis have been attempted, the sophistication of some of these being in marked contrast to the relative neglect of the analysed results. The penultimate section of this paper considers some of the outstanding problems of data collection, and examines some of the areas of controversy connected with analysis and application of results.

FARM MANAGEMENT STUDIES EMPLOYING EX-POST ANALYTICAL TECHNIQUES

This form of farm management survey has much in common with the earlier established descriptions of agricultural systems, as it is mainly concerned with building up a picture of the agriculture in a particular location. Whereas the former approach tended to be of a predominantly technical nature, however, this type of farm management survey also includes financial aspects of production and consumption. Nevertheless, studies of this nature are more concerned with giving a detailed picture of the current system than with investigating decision-making aspects of farming, or with planning business improvements, although they sometimes indicate likely areas of improvement, and examine aspects of the individual production unit.

Beck's survey 1/ of the coffee-banana agriculture on the slopes of Mt. Kilimanjaro in 1960-61 is typical of this class of investigation. A similar survey was carried out in Uganda at about the same time by Kearle.2/ Others have been completed in all three countries by students of the Faculty of Agriculture, Makerere College 3/, although these latter are as yet unpublished. A series of whole-farm studies of African peasant agriculture was initiated in the 1960 by the Farm Economics Survey Unit in Kenya.4/

- 1/ Beck, R.S., An Economic Study of Coffee-Banana Farms in the Machame Central Area: Kilimanjaro District, Tanganyika, 1961. Dar-es-Salaam, USAID, 1963.
- 2/ Kearle, D., An Economic Study of Coffee Farms in Mutuba III, Kyaggwe and Lubogo, Butambula, Department of Agriculture, Uganda, (mimeo) 1963.
- 3/ A list of special projects which contains the titles of the surveys referred to above may be obtained from the Faculty Office, Faculty of Agriculture, Makerere College, Kampala, Uganda.
- 4/ Farm Economics Survey Unit:
 - (i) Some Economic Case Studies of African Farms in the Rift Valley Province in 1961. Report No.13, April 1963.
 - (ii) Some Economic Case Studies of Farms in West Pokot District 1962. Report No. 15, December 1963.
 - (iii) Some Economic Studies of Farms in the Nandi District 1962/63. Report No. 18, February 1964. Ministry of Planning and Economic Development, Kenya.

The Uganda and Tanganyika surveys both listed the gathering of planning information as an aim; but without indicating in precise terms what was intended. Emphasis was given to measuring resources levels, capital investments, farm expenses, the use of labour, and the yields of various enterprises. Certain relationships such as those between the size of the business and labour-efficiency or yields and profits were derived using tabulation analyses. A check list was made of practices employed on farms in different size categories, and conclusions were drawn regarding coefficients relevant to different levels of efficiency. Input/output data for individual enterprises were not gathered in any detail, although money costs of growing coffee with hired labour were calculated.

The Kenya investigations covered a similar range of information but data was gathered over a series of interviews at approximately equal time intervals, as opposed to the single interview method employed in the other studies. Although the FESU investigations are entitled as case studies, each report contains an excellent description of the farming conditions in the area, in addition to an examination of available resources, land use and the financial performance of each individual farm studied. The analysis was based on the system of comparative analysis, in vogue in the UK during the 1950s after its introduction by Glagburn. Calculations were made involving the use of efficiency indicators, such as the value of production per acre for each enterprise, livestock units per acre of grazing, return to capital employed, and such indicators of profitability as Net Farm Income derived from a trading account. This entailed a whole farm approach with all its drawbacks in theoretical and pragmatic terms.^{1/}

The main instigator of the surveys admitted their shortcomings in a paper presented in 1962,^{2/} when he stated, "However limited the Unit's case study work has been in scope, it has shown what goes on in certain types of farming, the level of operation and achievement of certain individuals, the commonest shortcomings that are encountered and some of the external limitations that combine to limit farmers' progress. The major benefit of this kind of study is simply to describe these things, and thereby to get those concerned with agricultural progress in these and similar areas to view their problem in an economic as well as in a purely technical or administrative light".

^{1/} For a discussion of this topic see: Candler and Sargent, Farm Standards, and the Theory of Production Economics, J.A.E. February 1962.

^{2/} MacArthur, J.D., Whole Farm Studies in African Peasant Agriculture in Kenya: A Survey. Paper presented at the first Conference of East African Agricultural Economists, Kampala, November 1962. (Proceedings in Press) (eds.) Belshaw D.G.R., and Cleave, J.

Praiseworthy though these sentiments are, they indicate a preoccupation with the task of delineating problems rather than attempting actual empirical solutions.

The final group of farm management surveys is concerned with suggesting answers as well as indicating problems, thus adopting a normative rather than a positive emphasis. Before surveying this group, however, it is of interest to examine another important series of farm management surveys. These were carried out by a number of academic researchers in different parts of Tanzania. Information was gathered by the single interview method, and is probably not as accurate as the Kenya data, even though the interview was usually supplemented by actual field measurements. The report of the ten case studies 1/ does not concern itself with discussing data collection methodology. The analysis of the data, however, is remarkable for its use of regression analysis and of production function analysis, although this ex post type of analysis was probably forced on the researchers as the quality and detail of the data would not adequately support forward planning techniques.

FARM MANAGEMENT STUDIES USING EX-ANTE ANALYTICAL TECHNIQUES

The final group of studies concern themselves primarily with forward planning based on physical inputs and outputs, taking into account resource constraints and the profitability of alternative activities. The pioneer study in this field was that of Clayton 2/, who was the first man in East Africa to focus attention on the critical importance of labour when planning peasant farm improvements. Although the bulk of the data was drawn from secondary sources, the linear programming technique was used imaginatively. Some critics have indeed considered that there was too much imagination and not enough attention to the realities of the situation.3/ Clayton examined hypothetical farm situations in the main ecological zone of Central Province, Kenya, and using linear programming methods, arrived at optimal plans through

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- 1/ Ruthenburg H. (ed.) Small holder Farming and Small holder Development in Tanzania, IFO - Institute für Wirtschaft, Munich, 1968.
- 2/ Clayton, E.S. (i) Economic Planning in Peasant Agriculture, Wye College, 1963.
(ii) Labour Use and Farm Planning in Kenya, Empire J. of Exp. Ag., April 1960.
(iii) Economic and Technical Optima in Peasant Agriculture, J.A.E., May 1961.
- 3/ For a critique of Clayton's work, see MacArthur, J.D. Review article on : Economics Planning and Peasant Agriculture by Clayton. E.S. East African Economics Review, Vol. 8, 1963.

re-allocation of land and labour resources between competing activities. He also investigated the effects of hiring an extra unit of labour on a full-time basis (although surprisingly omitting the possibility of hiring casual labour at times of labour pressure) and demonstrated the effects of product price changes on the optimum plan.

Kenya

Heyer's study of annual crops are in Machakos District of Kenya was carried out in the early 1960s. Similar analytical techniques were applied 1/, but this study was an improvement on the original of the same type. The main improvements were that resource levels and input/output data were gathered in the field, thus leading to the formulation of more realistic resource situations. Production intensities for the same crop mixtures were also introduced into the programme by postulating a range of activities for the same product. This enabled a much closer simulation of the real alternatives facing the peasant farmer than Clayton's approach, and resulted in some solutions yielding unutilized land in an area of high population pressure, where, in reality, all the land could be used by adjusting labour intensities. Heyer's work was of particular importance in demonstrating the likely patterns of crop production in changing land/labour conditions (i.e., changing conditions of relative resource scarcity). It emphasized the fundamental error of the technical approach, which stresses maximum returns to land, irrespective of the resource situation, and to some extent vindicated many existing peasant practices.2/ The implications of the study for planning were clearly perceived by the researcher, but were not pursued far beyond the stage of conjecture, and no great effort was devoted to examining extension problems involved on the introduction of new techniques or enterprises. It did, however, focus with great clarity on the vital importance of labour availability, and the seasonal demands on this resource by farm and non-farm activities and employed a methodologically impressive analysis.

1/ An outline of Heyer's work is contained in her "Seasonal Labour Inputs in Peasant Agriculture". Paper presented to the second Conference of East African Agricultural Economists, Nairobi, January 1965.

See also J. Heyer, The Economics of Small-Scale Farming in Lowland Machakos. Occasional paper No.1. Institute for Development Studies, University College, Nairobi, April 1967.

2/ For a further discussion of this point, see Belshaw, D.G.R. and Hall, M. The Analysis and use of Agricultural Experimental Data Proceedings of the second Conference of East African Agricultural Economists. E.A. Publishing House (in press).

Tanzania

About the same time as the FESU and Heyer studies, Collinson ^{1/} conceived and supervised a very interesting series of surveys in the Sukumaland District of Tanganyika. The main innovations of these studies arose through the researcher adjusting to conditions of limited financial and personnel assistance, by adopting less precise recording and analysis techniques. These were considered to be adequate for the aim of the project, which was to improve the quality of extension advice over a wide area by identifying production constraints, gathering input/output data for the construction of simple farm models, and by the formulation of criteria for farmers' ability to use advice and credit. It was assumed that the collection of input/output data by the single interview method would give adequate data to use in the form of averages. It was further argued that rates of work varied so much between individual farm families, that it was better to risk a high observational error in an attempt to cut down on the sampling error by recording a larger number of randomly sampled respondents. The recording method also gave rise to inaccuracies in the output data, which was estimated by totalling produce in store, produce sold, and estimates of the volume consumed by the family. However, this peasant farm output data was dispensed with in later planning exercises. These were based on the programme planning method which employs gross margins as profitability indicators in the same way as the linear programming approach. Collinson utilized his survey data to build up the subsistence section of his model for which he also used calorie data, and estimates of the nutritional requirements of the average family. After simulating the impact of extension advice by increasing the efficiency of foodcrop production 150 per cent; released land and labour were available together with any previous surplus, to allocate among competing cash crops. The input data for these were derived from survey data, but the timing of the inputs was altered to conform with research station advice, and the related outputs were calculated from modified experimental data.

Thus Collinson accepted the subsistence constraint, the resource levels indicated by the survey and the level (but not timing) of labour inputs using existing cultivation techniques; but he modified factor/product ratios and planned a reallocation of resources based on these modifications. Some of his assumptions and procedures may appear rather crude and inaccurate, but the researcher was aiming at a less than perfect improvement effect over a large number of farmers. His work is an excellent example of a well integrated approach to peasant farm improvement, using research station and peasant farm survey data.

^{1/} Collinson, M.P., Farm Management Surveys in Sukumaland, Tanzania, (4 mimeo reports), Ukiriguru (Mwanza), Tanzania: Western Region Research Centre, 1962-65.

Uganda

Contemporary surveys in Northern and Western regions in Uganda were perhaps the most comprehensive in terms of the breadth of the information gathered. Detailed farm and household expenditures and incomes were recorded, as well as all produce outlets. Physical input/output data were also gathered on a systematic basis for individual plots and by labour classes, and technical details of each plot were recorded in diary form. Non-farm daylight activities were recorded for each respondent in order to aid the assessment of labour availability, and background information on the farmer and his family was also obtained. With very little previous experience to draw on, the scheme was not very clearly conceived. Although the general aims were stated, summary and analysis procedures were improvised rather than thoroughly worked out before the fieldwork commenced.

The aims of the recording were very broad, and included the provision of profit and loss accounts, extraction of mean input/output data for crops and crop mixtures (with references to both land and labour inputs) and the derivation of model and elite standards for enterprise gross margins, expressed in terms of per acre and per man hour. The planning aims were described as follows:^{1/}

"The initial approach to farm planning will be the use of conventional budgeting techniques, but it is also proposed to experiment with the application of linear programming in an attempt to assess its value in peasant farm situations."

Because of rapid staff turnover, much of the data was never properly analysed, but three impressive reports on farming in western region Uganda have been prepared by Pudsey (although only one has been published). ^{2/3/4/}

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- ^{1/} Cleave, J.H., The Collection, Analysis and Use of Farm Management Data in Uganda. Paper presented at the second Meeting of East African Agricultural Economists, Nairobi, January 1965. (Proceedings in Press) Belshaw, D.G.R. and Etherington, D. (eds.).
 - ^{2/} Pudsey, D. Economic Case Studies of Tea Outgrowers in Uganda, Department of Agriculture, Uganda, August, 1966.
 - ^{3/} Pudsey, D. Pilot Survey of 12 Farms in Toro. Department of Agriculture, Uganda, (mimeograph) June, 1966.
 - ^{4/} Pudsey, D. An Economic Survey of Farming in a Wet Long Grass Area of Toro. Department of Agriculture, Uganda, (mimeograph) 1967.

These reports strongly emphasize the overriding importance of returns to labour inputs in conditions of minimum capital production methods and surplus land, and they draw attention to the implications of the interacting labour profiles of different farm activities. Following the precedent of the census investigations, the Uganda farm management work directed particular attention to methodological problems. Perhaps the main weakness of the work has been a failure to apply the results to extension problems, or even to formulate theoretical improvements to farming systems. The use of some type of gross margin matrix planning would at least take account of the changing opportunity costs of inputs as activity proportions are varied, instead of simply comparing the profitability of each acre of an activity expressed as a return to labour. The study of tea outgrowers is particularly interesting, as it affords an example of a detailed examination of a crop with a fairly complex production process, which has been carried out in a whole farm setting. This achievement makes the tea data extremely valuable and such studies are to be commended. They can only be successfully performed, however, when the investigator is an experienced worker with a thorough knowledge of the economic and technical problems of the farming system being studied.

ENTERPRISE AND LABOUR STUDIES

This category of investigation, unlike commodity studies, endeavours to measure the financial, physical and technical requirements of isolated enterprises. With perennial crops and livestock enterprises, particular attention is accorded to the production cycle, the necessary resources, and the phasing of the build up to a mature operation. The FESU studies in Central Province, Kenya,^{1/} and Grimble's study of dairy enterprises in Buganda ^{2/} afford examples of this approach.

In the Kenya study, information was recorded concerning labour demand, physical and financial outputs, and cash inputs in the form of fertilizers, sprays and livestock requisites. The recording period was spread over one year and, for the perennial crop studies, samples were drawn from crops in different age categories including the planting stage, immature stages and fully bearing crop. The Uganda survey was completed within one month. Information was amassed on labour and purchased inputs, technical factors such as calving interval, stocking rates, lactation performance and herd composition; and on marketing and veterinary problems.

^{1/} MacArthur, J.D., Aspects of Agricultural Development in Nyeri District, FESU Report No.21, 1962, and 24, 1967.

^{2/} Grimble R., An Economic Survey of Dairy Farming in Uganda, Ministry of Agriculture and Co-operatives, Uganda, 1966.

Intimately connected with enterprise studies of the above sort are labour studies of the type carried out in Kenya by Kennedy,^{1/} and in Uganda, by Okai.^{2/} These investigations were, in a sense, simpler than the former ones as they concerned annual crops where the main input was family labour. The method of obtaining labour input data was by direct measurement of work rates for different operations. Kennedy was concerned with investigating the returns to labour in the cotton enterprise, whereas Okai was primarily interested in improving work rates by introducing more efficient work methods to eliminate labour bottlenecks, in a situation where some cotton operations competed with the labour demands of the main food crop, millet. The Kenya study produced valuable data on work rates and their variation under different field conditions, as well as supplying data on ox-cultivation techniques. The Uganda work demonstrated the potential for dramatic improvements in operational efficiency through better work methods. Both studies indicated the importance of formulating and co-ordinating the labour profiles of competing farm activities, although they were not directly concerned with gathering this class of data.

An inherent weakness of single enterprise studies is their lack of stress concerning the indication of optimal levels and techniques of production, because no data is available concerning enterprise combinations. Thus the analysis also neglects the opportunity cost implications referred to at the end of the previous section. Possible justifications for this approach arise from the possibility of allowing a more comprehensive sample for a given outlay of time and money, and the fact that with intrinsically complex enterprises such as dairying, the recording errors will be minimized by specialization of observations.

A CONSIDERATION OF METHODOLOGICAL PROBLEMS CONNECTED WITH DATA COLLECTION AND ANALYSIS

Controversy concerning the collection and use of farm level information still exist. Approaches to the solution of outstanding problems have been unco-ordinated; nor have alternative techniques been submitted to objective comparative tests. An examination of the successive stages of a typical field survey will help to highlight the main problems involved. Decisions on the optimum organization of each stage will, however, depend on the level of availability of all resources and the aims of the survey.

1/ Kennedy, I.J., A Study of Economic Motivation Involved in Peasant Cultivation of Cotton, East African Economic Review, 10.2.1963.

2/ Okai, M., Agricultural Development in Lango District, Uganda. Unpublished M.Sc. thesis, Makerere University College, Uganda.

The main problem in designing any survey lies, perhaps, in the area of interaction between sample size and visiting frequency, because of the dependence on farmers' memories to obtain details of work done and the disposal of produce. Given a fixed quantity of resources, however, a rise in the visiting frequency implies an increase in the sampling error through the reduction of the number of farms studied. A crucial factor in any compromise decision will be the degree of inter-farm variability compared to the drop in observational accuracy as visiting frequency diminishes. This will depend mainly on the size distribution of farms and the complexity of the farming system. An area of high homogeneity with regard to farm types and production techniques, would suggest a smaller sample size/visiting frequency ratio. Previous approaches to this problem have been rather imprecise, and current work on the cost-effectiveness of alternative approaches is to be welcomed.^{1/} Once the sample size has been decided, choice of sampling technique does not offer serious difficulties, although it would appear from Uganda experience that taxpayers' lists do not provide an adequate sampling frame and that a pre-enumeration exercise must be performed in order to obtain a satisfactory frame.

Another school of thought contends that preoccupation with sampling methodology is a waste of time as far as comprehensive farm management surveys are concerned. Two reasons are advanced to support this attitude. The first is that resources will always be so limited that the number of farms studied will be such an insignificant fraction of the total population that statistical sampling would be a meaningless exercise. The other reason is that, given a system of recording which depends on the goodwill and interest of the respondents, any loss in accuracy through sampling errors will be more than compensated by better co-operation from subjectively chosen respondents.

East African farm management investigations illustrate the whole range of alternative strategies. At one extreme, the Clayton study obtained the major part of the data used from government farms in various parts of Kenya, and applied it to a specific farming area. At the other extreme, Heyer adopted an almost anthropological approach, actually living for some time in the small location which she studied. Between these extremes lies the relatively cheap single interview method employed by Collinson on a random sample of farms. The FESU approach of infrequent visits to progressive farmers chosen by extension staff for their degree of co-operation, is perhaps in the middle of the continuum, and the Uganda method of visiting randomly selected farmers three times weekly, towards the more expensive extreme in terms of the number of farm records produced.

^{1/} J. Njukia, of the Department of Rural Economy, Makerere College, Uganda, is at present analysing data derived from a sample of farms using different visiting frequencies. This research project was designed to indicate the cost-effectiveness of different survey approaches and will be completed at Stanford Food Research Institute.

Recording problems centre around measures of labour input and the means of recording it, and the difficulties of recording outputs. Unless direct observations are made, and this would entail one full-time recorder per farm, the information must be drawn from the memories of the farm household. Few farmers possess watches but many have a fairly regular work routine and a remarkable sense of time. Difficulties occur, however, when only one person is questioned, as a husband does not always know where his wife is working and vice versa, and family members may start and finish work at different times. Post-harvest operations, such as shelling groundnuts or drying coffee berries, cause difficulties as they may be performed while the wife is cooking, and is therefore not available for work in the fields. Production operations also involve problems as they sometimes performed simultaneously e.g., bananas may be pruned and mulch spread during the weeding operation or seeds may be sown during a digging task. Such simultaneous actions may not be described fully in the records and this gives rise to suspicions concerning their accuracy.

A further point of controversy concerning labour inputs is the question of awarding different values to different classes of labour. Work rates may be affected by the age and the sex of the worker, and some researchers have awarded each class a different weighting because of this. Although women and older children are physically weaker and less able to do very heavy work, they tend not to be used on such tasks; thus for many of the jobs they do, they are at least as efficient as men. Perhaps only children below a certain age should be weighted downwards, and in most districts they do not provide a significant portion of the total labour input. Another debate centres around the advisability of recording non-farm labour activities which may compete with farm labour demands. More sophisticated analysis techniques could usefully employ such data, but the different uses of time tend to become blurred e.g., marketing may be combined with social visits and all extra data adds to research costs.

Harvesting practices give rise to problems in both labour recording and yield estimation. A large percentage of the labour used in harvesting is not recorded under this head. Food is often taken back to the homestead after work is finished, and the crop is harvested so gradually that the total harvest labour for a particular plot may comprise dozens of separate operations spread over weeks, and each lasting only a few minutes. This tendency to harvest food crops gradually also leads to difficulties in yield recording, as crops are harvested at different stages of maturity e.g., beans may be first harvested as tender green pods, and the final portion of the crop as dried matured beans in pod. Other crops such as cassava may never be harvested unless a food shortage occurs, yet they consume labour throughout the year.

Rather than use a method of estimating crop yield by using harvesting records, the use of crop cutting techniques has been advocated. Three queries may be raised concerning this. Will the farmer agree to having his crop cut? At which stage of maturity should it be cut? What level of inaccuracy arises from the measurement of biological yield as opposed to the economic yield, which results from farmers deciding after a certain point that the returns to harvest labour are no longer worthwhile.

The other method of yield recording, which consists of totalling the quantities utilized in different ways, gives rise to all sorts of complications, resulting from the need to identify the origins of the crop, and from the different forms in which it is utilized.

Both inputs and outputs must be related to an area of land and to a specific activity. A whole new series of problems is conjured up by this statement. Where does one decide where an activity begins and where it ends, when plots are gradually planted over a period of weeks? How can the effect of previous plot treatments be assessed, when a plot may be a composite of portions of three or four other plots, each of which have contained a different crop or crop mixture. A further set of controversies arises over the best methods of plot measurement and mapping. The analytical stage of farm management investigations has evolved from an earlier dependence on comparative analysis and experimentation with production function analysis, to a general reliance on the various forms of gross margin analysis and planning. The problems connected with costing the non-cash inputs so important in peasant farming, severely limit the use of the orthodox budgeting technique, but can be satisfactorily handled using either linear programming or the similar programme planning method. Each of these techniques includes both physical labour and capital input constraints as a consideration, and they progressively build up a plan by allocating physical resources to the activities capable of contributing most to farm profit, as measured by the total gross margin from available resources.

The employment of these techniques in farm planning is, however, associated with certain problems. The main disadvantages arise from the underlying assumptions of the techniques concerning factor and product prices, which are considered as known and factor/factor and product/product relationships which are assumed to be fixed over certain ranges. In addition the input/output coefficients connected with each activity are assumed to remain constant with changes in scale. By defining as separate activities different levels of the same enterprise, where changes in scale involve changes in unit costs or outputs, programming can be seen to depend on a succession of curves which can be approximated by linear segments. This device raises the problem of obtaining data of sufficient accuracy to delineate a series of activities which would cover the whole range of possibilities, and of the choice of width of range to insert into the matrix, as well as the optimal intervals which would cut down on the number of activities, yet still retain a realistic choice. More research employing multiple regression analysis techniques would seem to be necessary to illuminate this area of choice of activity.

Most planning exercises which have employed the linear programming technique in a peasant farm situation have relied on the use of mean data, and have applied the results to a specified farm situation rather than to an actual farm. Individual smallholding planning would be prohibitively expensive. This situation emphasizes the need for more work concerned with the identification of meaningful farm categories for planning purposes. Related to the

question of the use of mean coefficients is the problem of data validity, when information has been collected over a single time period. Sample data usually refer to only one crop cycle of farming year, and any set of coefficients derived from observed data will reflect particular climatic conditions during the survey.

CONCLUSION

The above weaknesses connected with the reallocation of peasant farm resources are exacerbated by the necessity to modify the objective function, by including in the matrix a series of constraints, which will allow the model to approximate more closely to reality. Such limiting factors as subsistence requirements, sex differentiation of tasks, control by individuals of certain crops, capital constraints, attitudes to risk, and the levels of the basic production resources of land and labour, help to refine the model, but also make it more specific and complex. More experience needs to be gained concerning the degree of refinement needed to make the model realistic yet still retaining a degree of general applicability.

Critics of the approach have stated that a model must become specific to one farm before it becomes sophisticated enough to approximate the real farm situation. This would make the use of such an approach for peasant farm improvement prohibitively expensive, even though such costs could be borne by the very large individual farms found in developed countries. It would not invalidate the use of such planning methods for the large transformation type of schemes, such as mechanized farming schemes and irrigation schemes, but would be of limited application on the majority of peasant holdings. The criticism has been countered by advocates of the farm-level, linear programming approach who have stated that, while individual farm use is too costly, simple models can be built for a range of the most common farm types. It is claimed that these can give valuable indications as to where extension workers should concentrate labour saving advice, and the optimum cropping patterns to follow. Since such an approach has not yet been applied in actual practice, it is difficult to know how strong these claims are. It is possible that the improvement indications given by such simple models will be no more informative than the subjective deductions of an experienced field worker. If this is the case, it may be more rewarding to concentrate on the use of complex, realistic models as educational tools rather than actual empirical indicators.

If it is discovered that farm models are more usefully utilized in this manner, with the field worker making ad hoc adjustments in advice to suit the individual farm situation, farm management data collection emphases will most likely be switched to the gathering of data which builds up a knowledge of the structure of agriculture in a region, and to the collection of statistics on some of the important agricultural relationships which can be used to formulate valid extension emphases. Data such as the size distribution of farms, age structure of perennial crops, organization of the marketing structure, distribution and functions of extension personnel and more micro-data such as labour/yield relationships, the production functions

of specific innovations, and economies of scale production effects, can help to build up regional level models. These models can indicate aggregate targets for the range of agricultural products and pricing policy, and extension emphases can be adjusted in line with these, leaving individual farm advice to the discretion of the change agent armed with a farm management handbook and an experience of the main production constraints, gained partly through teaching sessions with a generalized model.

This approach of 'planning from the top down' does not necessarily conflict with the use of models of farm types. The most likely advances to be made in farm management in the coming years would seem to be situated in the area of reconciling these approaches, and evolving a framework which would stipulate data collection and analysis procedures, which could make a more dynamic contribution to East African agricultural development than hitherto.

ARTICLE III
A CASE STUDY OF CO-OPERATIVE MARKETING OF FRESH VEGETABLES
AMONG UGANDA SMALL HOLDERS

By A. Scherer
Horticulturist and marketing adviser

SUMMARY

The example of an African marketing co-operative, engaged in marketing perishable vegetables, and formed by small holders, shows, that African co-operatives have a chance to compete and to play an important role in the field of marketing, when the necessary pre-conditions are fulfilled, and their work is adapted to their existing conditions, preferences and abilities.

INTRODUCTION

Co-operative marketing of fresh vegetables is regarded as a difficult task. As an example, the Kigezi Vegetable Union was chosen, because it represents practically all difficulties which can be experienced in the field of co-operative marketing. The number of more than 2,000 small holders on the production side, the struggle with overproduction, 260 miles distance to the main market, strong competition from regions closer to the market and from Kenya, all these constraints are not in favour of Kigezi. Fears predicting the failure of the scheme were common. But the development achieved in recent years by the Kigezi small holders is, in many respects, not in agreement with the usual published findings on African co-operatives. Their example proves that African small holders also operate under difficult preconditions, but have the potential to achieve progress if they are guided properly, and taught the meaning of co-operation. Thus the following paper is a contribution to the possibilities of the co-operative marketing idea in Africa as a whole.

PRECONDITIONS

The Kigezi Vegetable Union is located in the southern mountainous (6,000 feet = 2,000 m) part of the Kigezi district in south-west Uganda. The distance to Kampala, the main market outlet, is 260 miles, with 52 miles of murram road. The Union consists of over 2,000 small holders with an average farmholding of 2 acres, which is heavily fragmented. The farmers are organized in seven primary societies which form the Union.

The area of operation is approximately 30 miles in length mainly alongside the Kabale-Mbarara road. The majority of the growers belong to the Bakiga tribe. The Union deals with fresh vegetables only, which is one of the main sources of regular cash income to the members. Nearly all vegetables are sold by the Union on a wholesale basis in Kampala, Masaka, Mbarara and Kabale. Co-operative marketing in Kigezi was introduced in 1961, after a private company (1951-1961) claimed to have lost 18,000 shs. in its last

year of operation. At first a co-operative society including seven buying centres within the area was formed. In 1965, the society made a loss of 8,577 shs., and its operations were paralyzed by political and religious influences.

FUNDAMENTAL APPROACH

In order to make the co-operative workable, the first task was to eliminate all influences not connected with commercial vegetable growing and selling. All influential groups were approached for their support, and a platform of interest to all of them was developed. A reorganization of the production and marketing side on a workable basis for perishable products followed. The guideline in the scheme was, to develop everything in accordance with African habits, customs and way of thinking, and under the conditions existing. The main aim was to introduce only such measures and changes which could be understood by the most illiterate member in his remote homestead. Only one measure was introduced at a time, following a step by step system.

This, procedure is not in agreement with the approach of many foreign advisers, who mostly tend to implement the latest standard of their home country's system on an African co-operative, believing that this means development. They are unfortunately often encouraged by African officials, who sometimes think that everything done in other countries is better and more suitable than at home. Practical experience also shows in many cases, that it needs more adaptation, emotional penetration, and effort, for a foreigner or educated African to transform his knowledge to a level understood by a poor illiterate farmer.

To win confidence is the backbone of all field and co-operative work. This means continuous examples in small details, understandable to the members, a simple language, and much effort and patience. Observations show that many African countries do not lack experts from all types of organizations and good ideas represented in reports, but of advisers who are willing to involve themselves, in hard daily work, shouldering responsibilities and not minding, despite their academic degrees, to spend the time teaching illiterate farmers step by step. If each adviser would be forced to implement in practice the recommendation he gives in reports, African officials and farmers would benefit considerably.

Unnecessary administrative complications are avoided, and a streamlined organization is possible, if an officer in such a scheme is able to handle all aspects, starting from the production over the co-operative supervision, up to the marketing end, as was the case in the Kigezi Vegetable Scheme.

AGRICULTURAL ORGANIZATION

For agricultural extension work, more modern methods were adopted. Field assistants had to learn to show the growers better methods with their hands. The meeting system with long speeches was changed to daily field walks, teaching each farmer in his own field. Visits were concentrated on the backward growers, and not only on the progressive ones. Field trials

within the farmers' plot demonstrated better varieties and growing methods. With the formation of primary societies, self responsibility for local areas, and the competition factor between the societies was introduced. Problems of one society could no longer affect the whole scheme. The sales policy included everything useful for the expansion of the output, starting with more and better varieties, a more regular supply, better grading and packing, better service and competitive prices. An information system between the marketing and buying end was started, and the seed distribution was arranged in accordance with the market demand. Due to continuous staff changes, the staff policy was based on the selection of school dropouts, who were trained and proved to be more dependable on the job than employees with the possibility of joining better paying agencies after further training. At the same time, all committee members were trained as well.

FIELD ORGANIZATION

During the rains, the vegetable growers produce on the hill sides. In the dry season, production moves down to the swamps and water channels. This system now allows the Kigezi farmers to produce vegetables the whole year round, and to be regarded as the most reliable suppliers on the market. The products are carried to the society store by the farmer, mostly on their heads over paths and distances up to 10 miles. Each society has one market day per week.

At the society's store, the vegetables are first graded in "first" and "second" grade. Only first grade is bought. This selection is carried out by committee members selected in the general meeting for this task, and is supervised by the field assistant of the area. After a short time farmers found out that it was not worthwhile to carry second grade products to the market any longer. A campaign on how to eat vegetables resulted in most farmers regularly consuming the second grade products themselves. Thus after three years, an unpublished survey revealed that beside their local vegetables such as dodo, beans and peas, leaves, etc., most farmers started to eat regularly four to five types of the new vegetables. Cabbage, cauliflower, carrots, tomatoes, onions, leeks and brussel sprouts, spinach, lettuce have first preference. Vegetables of little appeal to them seemed to be: turnips, artichokes, broad beans, etc., a clear example, that nutrition education, if properly applied, can achieve quick results with African consumers.

After grading the vegetables, the products are put on the scale and weighed and bought by the secretary and treasurer of the society. The farmer receives a receipt and cash money on the spot. Other committee members pack the vegetables into crates and bags supplied by the Union. The farmers are offered seed, packed and delivered by the Union on a weekly basis, according to the number of members of each society, by another committee member. The society has only limited time available for its buying procedure until the Union lorry arrives. The Union hires transport on a one way basis, and with strong contract regulations. The Union manager inspects the products, and refuses inferior grades bought by the society. He buys in bulk the already packed products, and the Union employees load the lorry themselves. Cabbage is packed open on the lorry. Root crops are

in bags, vegetables as leeks, spinach, celery, parsley, etc., are transported as bundles, and only cauliflower, lettuce, tomatoes, etc., are packed in crates, which were locally developed with a collapsible frame and papyrus strings. This allows the Union to get the crates returned without additional transport charges. The Union manager pays the treasurer of the society afterwards in cash. The society works usually on a margin of 1-2 cts/lb. The lorry leaves Kigezi at approximately 3 - 5.00 p.m., and after offloading products in Mbarara and Masaka, has to arrive at the Kampala depot at 6.00 a.m. next morning, thus bringing the vegetables to the consumers within twenty four hours after picking.

As vegetable production can be influenced by many varying factors like weather, hailstorms, pest and disease attacks, etc., a fluctuation in supplies cannot be avoided. Therefore every week the Union submits to each society a requirement sheet for the following week, based on the sales situation at the marketing end. Usually most products are bought without restrictions. Overproduction occurs mainly with: cabbage, spinach and carrots. The society with excessive supplies, has to adjust its purchase price accordingly.

Since it was found that too many price fluctuations (usual in this type of business) were irritating to the growers, the Union tried to keep the price paid to the societies as stable as possible. The big share of annual tenders as a stable price element, allows such a policy, even though the Union undergoes periods with losses.

For the majority of farmers, who have never seen Kampala, the capital city, the performance of their society dictates their judgement about the success of their business. Hence, the main rule of the scheme is that the primary societies have to work successfully. On the other hand, a Kigezi farmer realizes his mistakes best if they hurt his pocket. Therefore, if the growers do not follow advice and concentrate, for example, only on cabbage production, neglecting other commodities, their society has to reduce the price in terms of oversupply and restrictions, while the neighbouring society may be able to continue with a higher price level. In their field work, the growers are advised by the Agricultural Department, and the supervision of the societies and the Union affairs is carried out by the Co-operative Department.

All day to day work is carried out by African employees only, the highest education standard being secondary II, and the average age 26 years. From the committee who formulates the policy of the Union, only two to three members understand some English and Swahili. Sales are handled in Kabale, Mbarara, Masaka, Kampala, with a staff of: two managers, nine clerks, and fifteen porters. Every week the Union has four market days and sends four lorries out of Kigezi with 50,000-70,000 lb of fresh vegetables.

MARKETING

The marketing arrangements of the Kigezi Vegetable Union had to fulfil the following tasks:

- (a) To sell as many products as possible for the growers. Since in south Kigezi the money from the vegetables is the only cash resource members depend on, they try to expand their production as much as possible. Therefore, the scheme had to be restricted to its present area of operation, only accepting new members from this area. The additional applications of 3,000-5,000 more farmers in neighbouring parts, shows the pressure and interest in expanding vegetable production;
- (b) To try to offer the grower the best return possible. Apart from the marketing difficulties, this co-operative policy was applied as far as possible. For some products, the Kigezi farmer receives a price comparable with that of his European colleague, a fact often overlooked in African countries:

<u>Product</u>	<u>Kigezi</u>		<u>Germany</u>	
	Sept.	December 1967	Sept.	December 1967
	cts/lb		cts/lb	
Cabbage	4	- 6	1	- 7
Carrots	9	-11	6	-12
Potatoes	10	-14	6	-10

Problems hampering these main marketing aims of the Union are:

- (a) The high overhead costs due to the long distance to the market. While the average producer price lies between 10-12 cts/lb the overhead costs account for 10 cts/lb, nearly the same amount. Five cts/lb fall to transport costs alone, although the possibility of hiring one way transport, gives Kigezi a favourable position in this field;
- (b) The strong competition on the market. Due to the colonial legacy, Kenya became the main supplier of fresh vegetables to Uganda. Many close links were established, e.g., many wholesalers and retailers in Uganda originate from Kenya. Many have relatives as growers or dealers there, which means that they will always prefer their links first. It proved to be very difficult to enter in an established trade set up. This fact is often underestimated by outsiders. Even with a competitive price policy and better quality, the share on the market can only be slowly expanded, and in seasons when Kenya has plenty of products, Kigezi experiences difficulties. But not only the competition from Kenya, but also the production in the regions situated closer to Kampala,

causes problems to Kigezi growers. Up to now, growers in these areas, comparing the income and work involved in a cash crop like vegetables with their existing crops such as coffee and cotton, find the latter more remunerative with less work involved. With the changing world market prices for coffee and cotton, and the diversification policy of the Government, more and more growers try vegetables as well. From the production point of view, most vegetables can be grown as well in these areas, usually even in a shorter period. Only high altitude products such as: peas, cauliflower, leeks, celery, etc., have a production advantage in Kigezi. But for products such as tomatoes, capsicum, french beans and lettuce, Kigezi has lost already parts of her market to those producers. Even if it might appear as capitalizing on the poverty of the growers, the long-term price policy of the Kigezi farmers had to be a low price policy, in order to discourage new-comers from entering the market;

- (c) Limited market demand. European types of vegetables have still a limited market outlet within the African population. In order to expand their market quantitatively, the Kigezi marketing policy concentrated on the wholesale trade, and on tender contracts with institutions such as schools, hospitals, army, etc. The Government policy to give preference to capable co-operatives, the comparatively low prices, the good quality, and all the year round production possibilities of the Kigezi farmers, allowed them to seize relatively fast upon this market. The development tender contracts were as follows:

1961	=	28	contracts
1965	=	40	contracts
1968	=	36	contracts

The risks of tender supplies had to be calculated as well. In times when the Kigezi farmers are short of onions, tomatoes, or potatoes due to the wet season in the area, profits are quickly exhausted, and supplies have to be bought from other sources at a higher price than the tender agreement. During school holidays, overproduction and wastage have to be faced.

Since the future expansion on the fresh markets for vegetables depends upon an increased consumption by the African population, the Kigezi marketing policy is concentrating on the introduction of vegetable consumption to this group. Low prices, often just on the break even point, advertising, a cheap retail store in the African quarters in Kampala, Masaka, Mbarara and Kabale are efforts in this direction. The existing retail trade caters mostly for the European, Asian and African higher income population, where higher profit margins can be obtained. To enter this field has its restrictions in the high rents for stores in suitable areas, and the lack of experience of the Union's staff in retail service etc.

Outside influences disappeared completely, and it is no longer a sensation when a Protestant majority chooses a Catholic secretary, etc., on qualification grounds only.

At the marketing end, every week, young sales assistants, who have no special training and qualifications, handle products worth 10,000-15,000 shs. without major difficulties. The Union gained slowly a good reputation for its services and reliability, and succeeded in getting new markets in fair competition against existing traders, by providing better service, good quality and cheaper prices. One of the limiting factors for further expansion is the inelastic demand for vegetables within the African population, and plans are underway to add a processing plant to the activities of the Kigezi vegetable growers.

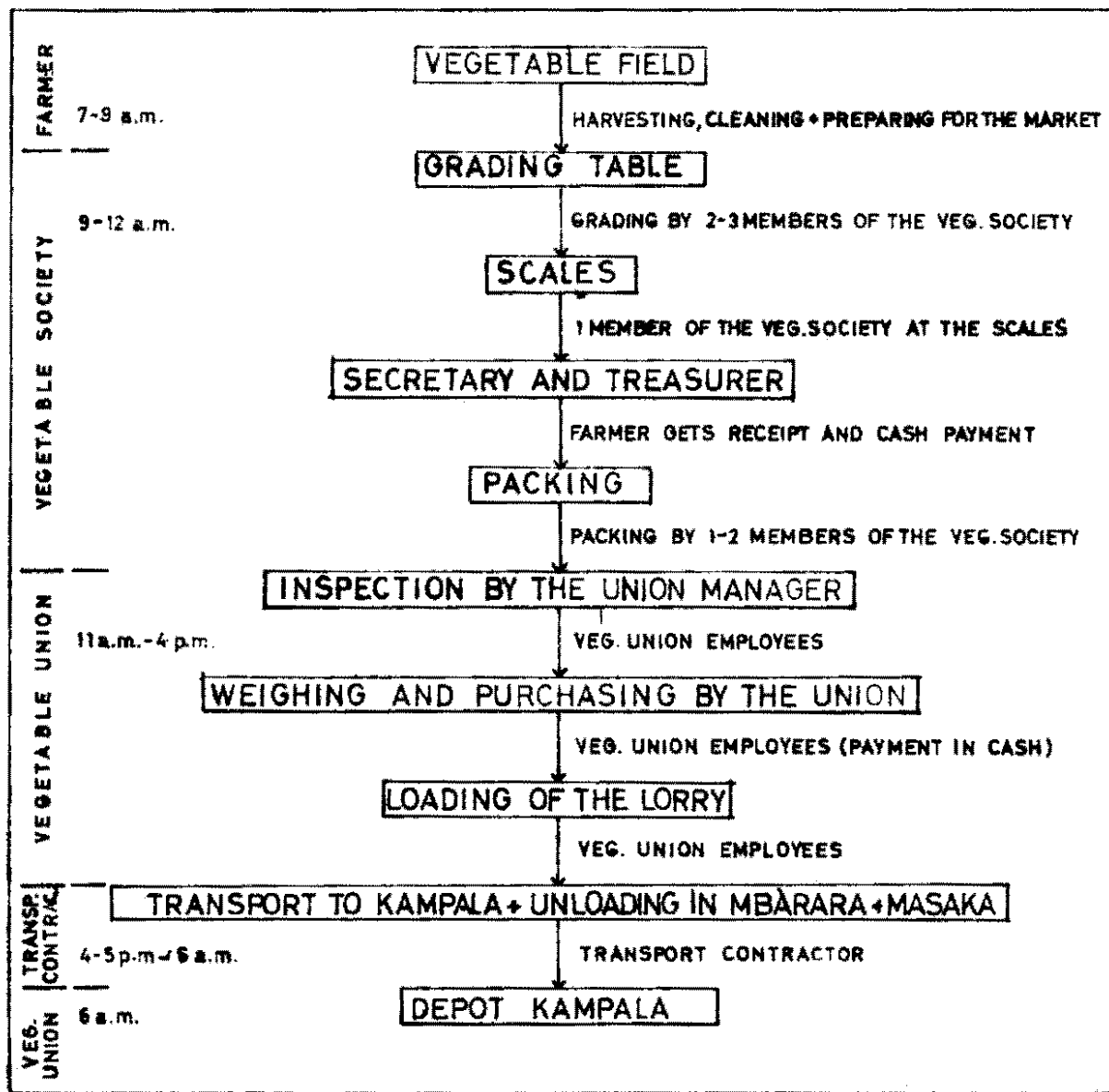


Figure 2: Showing stages in the marketing process for vegetables from field to commercial depot, Kampala.

ARTICLE IV
THE ACQUISITION AND TRANSFER OF TECHNOLOGY
FOR PRODUCTION ACTIVITIES IN AFRICAN COUNTRIES ^{1/}

SUMMARY

This paper summarizes the main issues involved in the subject of the acquisition of technology for production in Africa.

In particular, the paper focusses attention on the areas of concern covered by the overall subject of acquisition of technology for production in Africa, and identifies the different modes of acquisition which are of importance for each sub-sector of production in industry and agriculture.

Because of its limited objective, which was to provide a framework for discussion, the paper does not enter into the details of the issues raised, some of which are still controversial.

INTRODUCTION

This paper sets out the point of view of the Economic Commission for Africa on the subject of transfer of technology, and the issues in this field, which form the main items of concern within the African region. Within this region, the scope of the subject of technology transfer is much wider than the present coverage of the formal concern and discussions which have been going on in the United Nations system as the result of the UNCTAD II proposals on technology transfer. Most current discussion in the United Nations relates to the transfer of patented or privately owned technology, which can only be obtained through suitable contractual agreements. This is primarily the type of technology involved in highly sophisticated production processes, or in large-scale production processes, or in the manufacture of specialized products possessing a large technology content. Whilst this area of technology transfer is of considerable importance, it has present significance only for those countries in the region that have already attained a significant level of production technology, and that are ready to move into medium- or large-scale production of modern products with wide markets.

^{1/} This paper was prepared by the Science and Technology Section of the Natural Resources and Transport Division of ECA as a discussion paper for the twelfth session of the UNACAST (United Nations Advisory Committee on the Application of Science and Technology for Development).

Within the African region, our concern covers the whole question of the acquisition and transfer of technology for production in the African economies. This includes the transfer of technology to improve the production of age-old traditional products, the transfer of technology to small- and medium-scale industries, as well as the acquisition of large-scale production technologies for mass market goods. However, the production technology required in the African region does not relate to industry alone.

A great deal of improvement is necessary in the transfer of technology for agriculture, particularly for food production in the region. This is a crucial area about which a lot has been said, but relatively little achieved in the African region, probably due to too much discussion giving the impression of ongoing action.

One general question that requires attention before one starts to discuss the special features of the subject, is the question of the level of technology. This is a sorely debated question with many protagonists of different viewpoints. A viewpoint which is strongly promoted is, that the African countries do not required the advanced, sophisticated technology which is employed in production in the developed countries, but simple technology and simple equipment which is easier to use and easier to maintain. The most vocal protagonists of this viewpoint who form the "Intermediate Technology School" go further on to add that the simple technology and equipment required in the African countries are to a large extent already available in the form of old machinery and simple processes which were in use at an earlier period in the developed countries, but have now been superseded or replaced by more complicated and increasingly more highly automated technologies. In fact, one organization exists, run by believers in this viewpoint, which has prepared reference lists and catalogues of "intermediate technology" equipment and their existing suppliers. This approach of selecting deliberately simple, older technologies, is often buttressed by the argument that they are more labour-intensive than newer technologies and so will promote employment.

The arguments of the opposite school of thought are equally persuasive. Essentially, this group argues that the most up-to-date equipment and technology should be selected, having regard to the type and scale of production. This would provide lower costs of production because of greater efficiency in the utilization of factors, and hence would make the local products more quickly competitive with similar products from other advanced countries. This school of thought argues generally that deliberately selecting obsolete or obsolescent technology is a faulty investment policy for industrialization, and that the economics of each project only should determine the choice of technology. The debate continues and is unlikely to be resolved so long as it is conducted at a level of generalizations. In practice, one can usually determine which approach is relevant when considering a specific case.

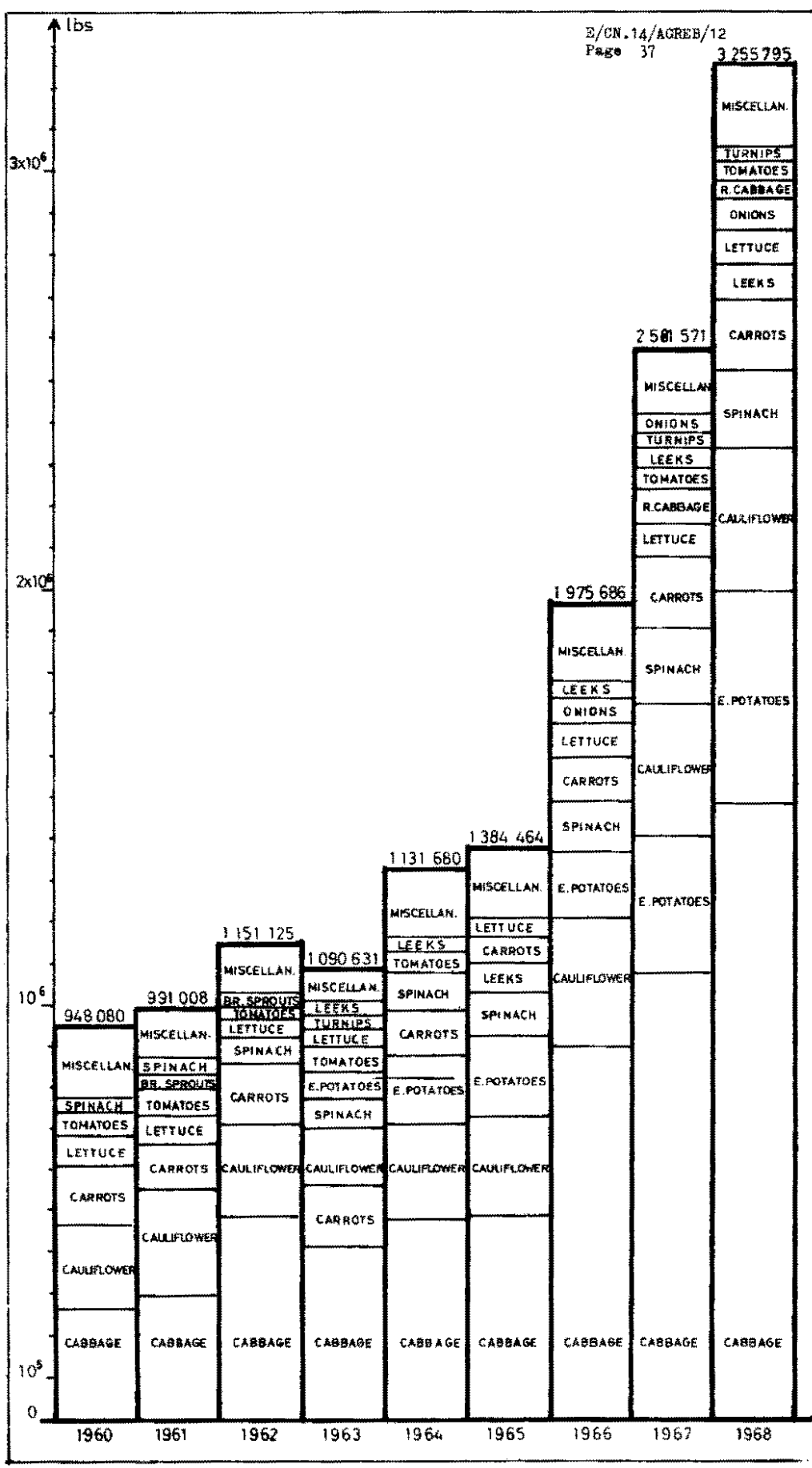


Figure 3: Annual vegetable purchases by the Kigezi Vegetable Union, 1960 - 1968, in lbs.

In addition to the debate on the level of technology, there is the question of the background to the transfer of technology which already exists within a country. It is important to consider the question of background, because transferring technology is, in some ways, like building a house. No house of any significance can be built except on a foundation, and the quality of the house that can be built depends on the extent and the importance of the foundations already laid. So it is with the transfer of production technology. Any plan or programme for technology transfer in any production area must be based either on existing traditional production methods, or where there is no such base, this must be created through a minimum of formal technical education within the educational system. Technology transfer is a cumulative process; the wider the existing technology base, the greater the amount of technology that can be transferred and the faster the rate of absorption of new and more sophisticated technologies.

PURPOSE OF TRANSFERRED TECHNOLOGY

The kind of technology, the sources and the arrangements for its transfer, will vary according to the type of production for which it is intended. The present range of production activities which are of concern within the region can be covered by the following categories:

Operative technology for small-scale traditional industries

In each country there exists a number of traditional industries producing consumer products, such as shoes and articles made out of leather, different kinds of woven and knitted textiles, special types of fabrics with traditional embroidery, carpets, domestic utensils for use in the kitchen and in other household tasks, brassware for utilitarian and decorative purposes, ornaments in precious metals such as gold and silver; many more examples can be enumerated. Many of such articles are widely available in local markets, and form part of the familiar range of consumer articles available in the markets and in the shops. However, because of the small-scale and the low productivity of the traditional methods of production, we are beginning to experience the phenomenon of imported articles, which imitate these local traditional products coming into the market to replace the local production at lower prices. In other cases, imported products for similar purposes but of a different design origin, are coming in to compete and, sometimes, to displace the locally produced traditional goods, owing primarily to their lower cost and to new utilitarian features in the competing products. Some action is necessary in order to preserve and also expand the production of these traditional industries. This is not just for sentimental reasons, but because some of the traditional products are better adapted to the local pattern of life, and their production provides employment for a considerable number of craftsmen working in small groups in each African country.

In this field of manufacture, improvements are necessary in production methods and in product design. Better production methods are necessary to improve the quality and increase output, and so bring down the cost of these traditional products. This will often involve the introduction of better tools, and perhaps some measure of mechanization of arduous manipulative operations. In addition to improving the technology and the employment in these traditional industries, it is also necessary in some cases for improvements to be made in the product design. Some of the current designs are very old and appear to have been frozen in the product forms. They have evolved very little even though the societies have changed considerably over the past decades. This category of production is an important one to provide for in any planning for transfer of technology.

Operative technology for technical services

(e.g., building, plumbing, electrical installations, vehicle repair, black-smithing, etc.). In all these fields, there are existing craftsmen, and depending on the country, they are at different levels of skill and knowledge of modern techniques, modern materials and modern processes in their various fields. However, in the plans which all the African countries are preparing for the building of infrastructure, for housing and urban development, for the creation of public service facilities and all kinds of industrial installations, many of the new structures and plants have to be constructed to modern designs, which required the most up-to-date techniques in such areas as civil engineering construction, building, and equipment installation. It is necessary that the present local craftsmen and the future ones be properly introduced to the latest techniques in these different fields, so that we will not have a perpetuation of the situation in many countries where blacksmiths, motor mechanics, electricians, etc., have to be imported from European countries to build up the local environment.

Some of the technology transfer which is necessary can be carried out in the trade schools. However, in most modern types of installations and large building programmes, special techniques are employed which are often the property of particular contracting firms, or of equipment suppliers. Hence, all the technology that is required in these service occupations cannot be properly covered in the trade schools. Other special arrangements will be necessary, in order to ensure that local labour with the required skills is available for the work of building up the new cities and the new industries, and that less money will be spent in the future in hiring skilled manual workers from developed countries for this category of operations.

Operative technology in the area of rural agriculture, food processing, preservation and storage

In the area of agriculture, the age-old practices and habits of life among peasant farmers, have resulted in the present pattern of production and the present level of productivity. Since agriculture and agricultural practices are very much tied in with the nature of the environment in terms

of soil, weather, water supply and other local physical characteristics, in general, the necessary technology for the improvement of agricultural production is not available, as a matter of course, by simple transfer from the developed countries, which are largely in temperate climates. This means that a great deal of the operative technology in the area of rural agriculture has to result from local research and development which will provide successful techniques for direct application. The situation is similar with the processing of foods and the preservation and storage of food products. Many of the staple foods and food products which are widespread in the African countries, are peculiar to those countries, and the improvement of the methods and the technologies for producing these food products again will require local research and development.

The first step in this process will involve the study of existing traditional food production processes, so as to establish the physical, chemical and biological parameters of traditional production techniques. These can then be extended and improved by the introduction of modern scientific concepts, in order to evolve better methods in terms of product quality and productivity. After the research and development has been successfully completed, extension arrangements will be necessary, including the use of pilot projects, so as to transfer these improved technologies, and in some cases, new equipment, to the local producers.

One point which has been neglected in many countries where steps have been taken to study existing traditional food processing procedures, and to develop modern versions, has been the failure of governmental research institutions to promote the adoption of their newly developed methods by local businessmen. It is important that policies and procedures be formulated for associating local businessmen with the operation stages of pilot plant projects.

Operative technology for import substitution industries

In this category we are dealing with the production of goods which are currently being imported and hence only obtainable from abroad. Two important characteristics of these imported products are that they have been designed as well as manufactured abroad. Hence the subject of the transfer of technology in this category of industries has two aspects: there is the aspect which relates to the technology incorporated in the product design, and a second aspect which concerns the technology for the manufacture of the product itself. Where the product design is patented or otherwise privately owned, the transfer of the design technology can only be practical for medium- and large-scale industries. However, the technology for the manufacture does not necessarily fall into the same category as the technology for the design. This is to say, that many patented products can be manufactured by generally known and well established production methods. Hence we can have a product based on a patented design, but which can be manufactured by generally available methods of manufacture. On the other hand, both the design as well as the manufacturing process may be privately owned and only obtainable

ARTICLE V
ARTICLES PUBLISHED IN THE AGRICULTURAL ECONOMICS BULLETIN
FOR AFRICA, 1962 - 1969

ECA/FAO Joint Agriculture Division

Frequent requests are made to the ECA/FAO Joint Agriculture Division for articles on various subjects related to agricultural economics or agricultural development in Africa. For ease of reference, we have abstracted below, under subject-matter title and by author, articles which have appeared in the Bulletin since its inception in 1962, for the benefit of our readers:

A. AGRICULTURAL DEVELOPMENT AND PLANNING

<u>Author and title</u>	<u>Bulletin No.</u>	<u>Date of issue</u>	<u>No. of pages</u>
FAO The Food and Agriculture Situation in Africa	2	Jan. 1963	17
E.L. Greenshields Watershed Planning Processes and Evaluation Methods	3	June 1963	20
D.J. Shaw A Note on Sudan's Ten-year Plan of Economic and Social Development	3	(Ibid.)	14
R.W.M. Johnson The Northern Province Development Scheme, Northern Rhodesia	5	April 1964	69
FAO The Food and Agriculture Situation in Africa - A Five-year Review	5	(Ibid.)	19
ECA/FAO Policies in the Field of Food and Nutrition as part of National Economic Policies	6	Oct. 1964	6
A. Suliman and D.J. Shaw Problems of Income Stabilization in Devel- oping Countries (A Case Study of the Gezira Schemes)	8	Dec. 1966	24

<u>Author and title</u>	<u>Bulletin No.</u>	<u>Date of issue</u>	<u>No. of pages</u>
ECA/FAO The Feasibility of Socio-Economic Data Collection and Presentation at the Local and Regional Levels in Africa	9	Oct. 1967	23
A. Bottomley Planning for Innovation in African Rural Areas	9	(Ibid.)	15
ECA/FAO Place of Agriculture in the East African Economy	9	(Ibid.)	25
ECA/FAO Notes on Current Plans for Development of Agriculture in East Africa	10	July 1968	26
ECA/FAO Inter-Industry Relations in North Africa	10	(Ibid.)	22
ECA/FAO Selected Agricultural Inputs in North Africa	10	(Ibid.)	6
ECA/FAO Agricultural Production, Productivity and Investments in the Development Plans of East African Countries	11	May 1969	26
H.J. Mittendorf Need for Improving the Planning of Fruit and Vegetable Processing Industries in Tropical Africa	11	(Ibid.)	10
B. AGRICULTURAL CREDIT AND INVESTMENTS			
- Recent Developments in Agricultural Credit in Tunisia	1	Sept. 1962	4
- Development Centre on Agricultural Credit for Africa	1	(Ibid.)	1
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<u>Author and title</u>	<u>Bulletin No.</u>	<u>Date of issue</u>	<u>No. of pages</u>
ECA/FAO Possibilities of Establishing an African Stabilization Fund	3	June 1963	10
ECA/FAO Credit Aspects of Land Reform in Africa	7	Sept. 1965	17
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P.W. Stutley Some Aspects of the Management of Beef Cattle Including Ranching and Extension	6	(Ibid.)	17
I. Maan The Fullest Utilization of By-products of Animal Origin	6	(Ibid.)	9
ECA/FAO Some Notes on the Economics of the Beef Industry in the West African Sub-region	10	July 1968	12
D COMMODITIES			
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-- Liberians Invest in Rubber	1	(Ibid.)	2
-- African Meeting on Commodity Stabilization	2	Jan. 1963	4

<u>Author and title</u>	<u>Bulletin No.</u>	<u>Date of issue</u>	<u>No. of pages</u>
ECA/FAO Groundnuts and Groundnut Oil	3	June 1963	14
R. Dumont An Introductory Note on Development Prospects for Intra-African Trade in Agricultural Commodities	7	Sept. 1965	16
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- Summary Report on Irrigation Schemes in Africa	2	Jan. 1963	2
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ECA/FAO Planning Land Settlement Schemes	1	(Ibid.)	34
- Paysannat Settlement in the Congo	1	(Ibid.)	2
- The Peasant Farming Scheme in Northern Rhodesia	1	(Ibid.)	1

<u>Author and title</u>	<u>Bulletin No.</u>	<u>Date of issue</u>	<u>No. of pages</u>
ECA/FAO Fiscal and Financial Aspects of Land Reform in the Republic of the Sudan (1920-1961)	2	Jan. 1963	30
P. Landell-Mills On the Economic Appraisal of Agricultural Development Project: The Tanzania Village Settlement Schemes	8	Dec. 1966	36
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J.C. Abbott Market Prospects for Poultry Industries in African Countries	8	Dec. 1966	13
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ECA/FAO Area Measurement Techniques: Some Observations on the Methodology Developed in Kenya Research into Small Farm Economy	9	(Ibid.)	11

GUIDELINES FOR SUBMITTING ARTICLES
TO THE AGRICULTURAL ECONOMICS BULLETIN FOR AFRICA

Length: Papers should not be more than 3,000 words in length, typed in double space. Authors should present their data with the maximum clarity in the minimum of space. They should also indicate whether or not the article has been published elsewhere before.

Manuscript: Copies of the manuscript should be either in English or in French. Top copies should be suitable for offset or direct presentation to the printer. They should therefore be on white paper about 8" by 10" or 21 by 27 cm. The left-hand margin should be 3 cm. If authors stencil their articles the Economic Commission for Africa would be grateful for at least six copies. If typed, four copies should be submitted.

Title: The title of the paper should be typed in capitals and should be specific and concise. The author's name, qualifications, and institution should appear in ordinary type centrally below the title.

Abstract: Every paper should have a summary, following the title and preceding the main text, and should not exceed 200 words.

Section headings: Whenever possible, papers should be divided up into sections, which should be described by short headings of three or four words.

Footnotes: Whenever possible, these should be avoided.

References: Reference to literature must be indicated in the text by superscript numerals and a list correspondingly numbered should be given at the end of the text of the paper under the heading References, not Bibliography of Literature cited.

Proofs: When a paper has been accepted, it is published in that issue of the Bulletin which the editor finds convenient. Authors will be responsible, where possible, for correction of the first proofs. Corrections must be confined to the elimination of printing errors. If corrected proofs are not returned within 2-3 weeks, it will be assumed that they are in order and the editor will proceed with publication.

Tables, charts and graphs: These should be placed on separate pages.

Manuscripts should be sent to:

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